

DETAILED ACTION

1. In view of the appeal brief filed on 10/3/11, PROSECUTION IS HEREBY REOPENED. New grounds of rejection are set forth below.

To avoid abandonment of the application, appellant must exercise one of the following two options:

(1) file a reply under 37 CFR 1.111 (if this Office action is non-final) or a reply under 37 CFR 1.113 (if this Office action is final); or,

(2) initiate a new appeal by filing a notice of appeal under 37 CFR 41.31 followed by an appeal brief under 37 CFR 41.37. The previously paid notice of appeal fee and appeal brief fee can be applied to the new appeal. If, however, the appeal fees set forth in 37 CFR 41.20 have been increased since they were previously paid, then appellant must pay the difference between the increased fees and the amount previously paid.

A Supervisory Patent Examiner (SPE) has approved of reopening prosecution by signing below:

/STEPHEN M HEPPERLE/

Supervisory Patent Examiner, Art Unit 3753.

Claim Rejections - 35 USC § 103

2. The text of those sections of Title 35, U.S. Code not included in this action can be found in a prior Office action.

3. Claims 10, 12, 18, 20-22, 27, and 32 are rejected as understood under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. (6,595,487) in view of Williams (4,802,502).

Johansen et al. disclose a system comprising a submersible actuator (1) comprising a first housing (area that encloses the motors) having an electric motor (7 and 8) disposed in a first fluid, wherein the first pressurized fluid is a pressurized lubricating liquid (col. 5, lines 54-56); and a second housing (area that encloses the control components) having a control circuit, and wherein the control circuit is coupled to the electric motor, and the control circuit is configured to communicate with the remote control station (col. 5, line 27 to col. 7, line 17). Johansen et al. fail to disclose that the control circuit is disposed in a second pressurized fluid, wherein the second pressurized fluid is nitrogen. Williams discloses an enclosure that is overpressurized with an inert gas (col. 4, lines 10-15) in an electronics chamber (10)(col. 6, lines 1-3 and lines 38-40). The use of inert gas in Williams would meet the more specific term of nitrogen, since inert gas would encompass all known and unknown inert gases.

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize an overpressurized electronics enclosure that utilizes an inert gas for the overpressurized fluid as taught by Williams within the enclosure of the electronics housing of Johansen et al, in order to provide an atmosphere that has higher pressure in the electronics chamber than the surrounding environment which prevents the outside environment from entering the electronics chamber and further the inert gas prevents a hazardous situation (explosion) as taught by Williams.

Regarding claim 12, the claim limitations are addressed in the rejection above, see Johansen et al.

Regarding claim 18, the system comprising a flow control mechanism (2) coupled to the submersible actuator as disclosed by Johansen et al.

Regarding claim 20, the apparatus as disclosed per the above meets the claimed method steps.

Regarding claim 21, the method comprising receiving an electrical control signal from a remote control station (34)(col. 7, lines 29-60)(Johansen et al.), processing the electrical control signal in the in the control circuit, and triggering the electric motor to actuate a submerged flow control mechanism (2)(col. 7, lines 25-29)(Johansen et al.).

Regarding claim 22, wherein the at least one electric motor comprises first and second electric motors, and the method further comprises independently controlling the first and second electric motors to enable independent actuation of a submerged flow control mechanism (col. 6, lines 9-10)(Johansen et al.).

Regarding claim 27, the structural limitations as claimed have been addressed in the above rejection of claim 17 and also in the rejection of the claims 10 and 18.

Regarding claim 32, the system comprising a visual recognition device (36)(col. 7, lines 29-33) and a robot interface (3b) coupled to the submersible actuator (col. 5, lines 27-44), wherein the visual recognition device enables viewing of an actuation position associated with the submarine device, and the robot interface enables a robot to control the submersible actuator.

4. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. in combination with Williams as applied to claim 12 above, and further in view of Ursel et al. (WO 01/99259)(utilizing US Pat. 6,906,438 for translation).

Johansen et al. in combination with Williams disclose a drive shaft (5) and that each motor is independently able to control the drive shaft. Johansen et al. in combination with Williams fail to disclose that the transmission comprises a worm screw coupled to the transmission shaft and a sprocket coupled to the worm screw and the drive shaft, wherein the electric motors are coupled to the transmission shaft. Ursel et al. disclose a worm screw (26) coupled to a transmission shaft (25) and a sprocket (43) coupled to the worm screw and a drive shaft (col. 1, line 49 to col. 2, line 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a worm screw/sprocket drive system as disclosed by Ursel et al. as the gearing between the motors and drive shaft of Johansen et al. in combination with Williams, in order to have a gearing system that prevents slipping.

5. Claims 14, 16, 19, 24-26, 30, and 31 are rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. in combination with Williams as applied to claim 10 above, and further in view of Welz, Jr. et al. (6,279,870).

Johansen et al. in combination with Williams fail to disclose wherein the control circuit is configured to compare a value of a control signal with an average of a predetermined number of previous control signals. Welz, Jr. et al. disclose a controller and sensor that is programmed to receive and compare the valve position to determine whether the valve is in the desired valve position and, if necessary, to instruct the motor to reposition the flow-control valve member in the desired valve position (col.1, lines 57-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a control system as disclosed by Welz, Jr. et al. that verifies the positioning of the valve per previous actuations with the actuator system of Johansen et al. in combination with Williams, in order to ensure that the valve is being placed into the desired position.

Regarding claim 16, the combination as presented would also meet the functional control language as recited in the claim.

Regarding claims 19 and 25, the control system as presented in the combination of Johansen et al., Williams, and Welz, Jr. et al. would run the motor in either the forward or reverse direction depending on the information received from the sensor to correctly position the valve.

Regarding claims 24 and 30, the method further comprising controlling the submersible actuator based on a target position, feedback, and historical data associated with the submersible actuator would be met per the combination as presented above, since Welz, Jr. et al. senses the position of the valve per repeated actuations and adjusts the position of the valve if the last actuation is not commensurate with the previous movements.

Regarding claims 26 and 31, the method further comprising controlling the submersible actuator based on a first feedback indicative of an actuator position and a second feedback indicative of an absorbed current would be met per the combination as presented above, since Welz, Jr. et al. senses the position of the valve per repeated actuations and adjusts the position of the valve if the last actuation is not commensurate

with the previous movements. The movement of the valve is indicative of an absorbed current of the motor per Welz, Jr. et al. and the sensor of Johansen et al. further would indicate the actuator position based off of the measured parameters of the valve position and measuring the number of turns of the motor which would also be indicative of the absorbed current (col. 3, line 66 to col. 4, line 30 and col. 6, lines 19-35).

6. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. in combination with Williams as applied to claim 10, and further in view of Schoenberg (5,166,677) and further view of Andre (4,902,030).

Johansen et al. in combination with Williams disclose all the features of the claimed invention except it does not show the pressure balancing device and where it is connected to the unit, Schoenberg discloses a pressure balancing device (40) that is connected to the first housing (13)(col. 6, lines 55-64). Andre discloses utilizing piston and membrane accumulators interchangeably (col. 5, lines 43-47 and line 63-65).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a pressure control device attached to the first housing as disclosed by Schoenberg with the device of Johansen et al. in combination with Williams, in order to be able pressurize the interior of the first housing at various depths.

It would have further been obvious to utilize a membrane accumulator in place of the piston accumulator of Johansen et al. in combination with Williams and Schoenberg; since Andre discloses that the piston and membrane accumulators are interchangeable.

7. Claim 28 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. in combination with Williams as applied to claim 27 above, and further in view of Ursel et al. (WO 01/99259)(utilizing US Pat. 6,906,438 for translation).

Johansen et al. in combination with Williams disclose a drive shaft (5) and that each motor is independently able to control the drive shaft. Johansen et al. in combination with Williams fail to disclose that the transmission comprises a worm screw coupled to the transmission shaft and a sprocket coupled to the worm screw and the drive shaft, wherein the electric motors are coupled to the transmission shaft. Ursel et al. disclose a worm screw (26) coupled to a transmission shaft (25) and a sprocket (43) coupled to the worm screw and a drive shaft (col. 1, line 49 to col. 2, line 3).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a worm screw/sprocket drive system as disclosed by Ursel et al. as the gearing between the motors and drive shaft of Johansen et al. in combination with Williams; in order to have a gearing system that prevents slipping.

8. Claim 29 is rejected under 35 U.S.C. 103(a) as being unpatentable over Johansen et al. in combination with Williams as applied to claim 27 above, and further in view of O'Connor et al. (3,699,989).

Johansen et al. in combination with Williams fail to disclose wherein the control circuit is configured to adjust a speed of the electric motor on a current position and a target position of the submarine device. O'Connor et al. disclose altering the electricity that is supplied to a speed controlled motor (col. 5, line 34 to col. 6 line 5).

It would have been obvious to one of ordinary skill in the art at the time the invention was made to utilize a controller for controlling the speed of a motor as disclosed by O'Connor et al. in combination with the subsea actuation system of Johansen et al. and Williams, in order to vary the speed of the motor to be capable of fine tune adjustments which are not possible when the motor is running at full speed.

Response to Arguments

9. Applicant's arguments with respect to claim 10, 12-16, 18-22, and 24-32 have been considered but are moot in view of the new ground(s) of rejection. Regarding applicant's remarks, as they apply to the above, Welz, Jr. et al. and O'Connor et al. are relied upon to show the functional control language.

Conclusion

Any inquiry concerning this communication or earlier communications from the examiner should be directed to CRAIG SCHNEIDER whose telephone number is (571)272-3607. The examiner can normally be reached on M-F 8:00 -4:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Stephen Hepperle can be reached on (571) 272-4913. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/Craig M Schneider/
Primary Examiner, Art Unit 3753
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